Computer Science 3300 - Computer Systems Organization

Credit hours: 3   CRN: 18915

Spring 2019 Syllabus

Instructor: Nicolas Widman, PhD

Meetings: MW 4:00 PM – 5:15 PM, Poole Agricultural Center A102

Office Hours: TR 3:00 PM – 4:30 PM or send me an email to set up an appointment

Office Room: McAdams Hall 306   E-mail: nwidman@clemson.edu

Textbook: Computer Organization and Design (5e) - Interactive Version (MIPS), by David A. Patterson and John L. Hennessy, Elsevier / Zyante (**zybooks.com**), 2016.

Prerequisites:

CPSC 2120 and CPSC 2310 with grades of C or better.

Course Description:

Introduction to the structure of computer systems. Various hardware/software configurations are explored and presented as integrated systems. Topics include digital logic, basic computer organization, computer arithmetic, memory organization, input/output organizations, interrupt processing, multiprocessors, and cluster computers.

Outline of Topics:

- Computer abstractions and technology
- Digital logic and devices
- Processor technology: datapath, pipeline and hazards, multiple issue, out-of-order execution
- Memory technology: memory hierarchy and caches, cache performance, performance optimization
- Parallel processing technology: categorization, multithreading, chip multiprocessing, cluster

Expected Course Outcomes:

By the end of the semester, a student will be able to

A) Explain memory hierarchy and cost-performance trade-offs.
B) Create state and transition diagrams for simple problem domains.
C) Identify the main types of memory technology and describe the use of memory hierarchy.
D) Describe instruction level parallelism and hazards, and how they are managed in typical processor pipelines.
E) Design the basic building blocks of a computer: arithmetic-logic unit (gate-level), registers (gate-level), central processing unit (register transfer-level), memory (register transfer level).

Important Dates:

January 15: Last day to register or add a class

January 23: Last day to drop a class without a W grade

March 15: Last day to drop a class without final grades

Tuesday April 30 7:00 PM – 9:30 PM: Final Exam

Grading:

- 15% - Homework assignments
  - 6 homework assignments at 2.5% each.
- 15% - Projects / Programs
  - 3 Projects at 5% each.
- 10% - Zybooks participation activities
- 5% - Quizzes
- 5% - Attendance (Reduced by 1/5 for each absence after the 5th)
- 30% - In-class exams
  - 2 at 15% each
- 20% - Final Exam

Unless otherwise noted all course work is individual. Do not discuss the solution to an assignment with anyone else (either a class member or someone else). If you have questions, ask me in person or by email.

Attendance Policy:

The attendance policy for CPSC 3300 is that your regular attendance in every class is expected. If you miss class, the responsibility is up to you to get any and all notes and announcements for that class. Should class be cancelled on my end, I will send out an email to the class alerting you of this. Likewise, if class has already started and I am not there within 15 minutes of class starting (4:15pm), you may assume class is cancelled and leave. **Attendance will be taken via Checkin (https://checkin.cs.clemson.edu/login/) starting on 1/16. A full 5% toward your grade will be given if you have 5 absences or less, reduced by 1/5 (lowers grade total by 1%) for each unexcused absence after the 5th with 0% for attendance for 10 or more absences.**

Cancelled Class Policy:

Any exam that was scheduled at the time of a class cancellation due to inclement weather or campus closure will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

Missed Assignments Policy:

- Homework Assignments – Homework assignments are due at class time on the due dates; no late homeworks will be accepted since on some due dates the homework answers will be discussed during class time.
- Projects / Programs – Projects turned in late will automatically result in a 10 point deduction on top of whatever grade is received. Each consecutive day that the assignment is still not turned after that will result in an additional 10 points deduction per day.
- Exams – No exam shall be made up under any circumstances.

Communication:

You are required to check your Clemson email and Canvas once a day. Any important course announcement will be made on the Canvas page. All email to the instructor must come from your Clemson email address. Please allow 24 hours for me to respond to your email (48 hours on weekends/breaks). I will not correspond with your parents or guardians about your grades.

Syllabus or Assignment changes Clause:

"The professor/instructor reserves the right to make changes to the syllabus, including project due dates and test dates (excluding the officially scheduled final examination), when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules."

Academic Integrity: Clemson's Official Statement

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

Academic integrity is taken very seriously. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Unless otherwise stated explicitly in an assignment, each student must work independently on assignments and labs. You **may not** use assignments or sample solutions from previous semesters as a resource. The University's academic integrity policy can be found at:

http://www.clemson.edu/administration/student-affairs/student-handbook/universitypolicies/academic_integrity.html

Questions related to course assignments and the academic honesty policy should be directed to the instructor. Collaboration policies will be posted on each assignment. Violation of the academic integrity policy will result in an academic dishonesty charge which can lead to an F in the course or expulsion from the university.

Accessibility Statement

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building.

Appointments are strongly encouraged – drop-ins will be seen if at all possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: http://www.clemson.edu/campus-life/campus-services/sds/.

Clemson University Title IX (Sexual Harassment) statement

Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).